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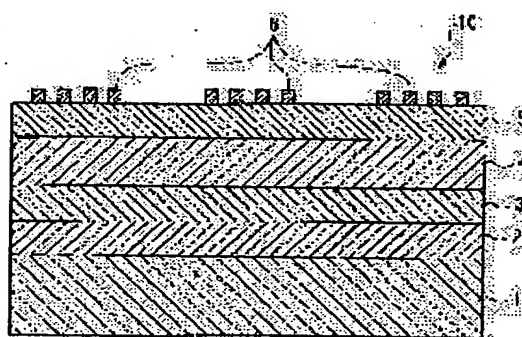
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(54) SURFACE ACOUSTIC WAVE DEVICE WITH KNbO<sub>3</sub> PIEZOELECTRIC THIN FILM,  
 FREQUENCY FILTER, OSCILLATOR, ELECTRONIC CIRCUIT, AND ELECTRONIC APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a surface acoustic wave device with high  $k^2$ , a frequency filter, an oscillator, an electronic circuit, and an electronic device employing the surface acoustic wave device.

SOLUTION: A first oxide thin film layer 2 comprising SrO or MgO and a second oxide thin film layer 3 comprising SiTiO<sub>3</sub> are sequentially formed on top of a 110 Si substrate 1, or a first oxide thin film layer 12 comprising CeO<sub>2</sub>, ZrO<sub>2</sub>, or yttrium-stabilized zirconia and a second oxide thin film layer 13 comprising SrTiO<sub>3</sub> are sequentially formed on top of a (100) Si substrate 11, a KNbO<sub>3</sub> piezoelectric thin film 4 (14) is then formed on top of either of these second oxide thin film layer 3, 13, and then, a protective film 5 (15) comprising oxide or nitride is formed on top of the KNbO<sub>3</sub> piezoelectric thin film, finally, at least one electrode is formed on top of this protective film to form a surface acoustic wave device, which surface acoustic wave device is employed to form a frequency filter, oscillator, electronic circuit, or electronic device.



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